

# Human Health Exposure to Adverse Environmental Impact in the Khabarovsk Kray of Russia

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Key words : human health, harmful environmental factors, Russian Far East.

## Abstract

The authors analyze harmful environmental impact of both natural and technical factors on human health. While describing the Khabarovsk Kray geographic, climate, flora and fauna peculiarities they demonstrate that the main ecological factors affecting people's health are general pollution, air pollution and poor quality of drinking water, especially in large populated areas leading to a high morbidity of 137,193.4 cases per 100,000 people.

Forest fire rate in the territory of the Kray is Russia's highest. Raising the level of ecological awareness and making the public to partake in solution of environmental problems are among the efforts to be made to improve the situation. Medical nurses of the Khabarovsk Kray have always been contributing to the improvement of the environment through population education in healthy lifestyle and accurate and careful attitude to nature and our habitat.

## Introduction

Being of vital importance for human health, environment is one of the four basic concepts (a paradigm) underlying a nursing science. It was Florence Nightingale, a famous nurse, who acknowledged the importance of environmental impact on disease prevention and health promotion as early as in the 18th century. This paper presents some data on the impact of physical environment on the health of

Khabarovsk Kray residents.

## Khabarovsk Kray: General information

Khabarovsk Kray is located in the easternmost part of Russia. On the one part, it is a remote territory, distant from economically developed regions of this country, 5-6 thousand kilometers away from industrial centers of the European Russia, 570-1,500 kilometers away from other major cities of the Russian Far East. On the other part, it is located in the heart of the Eastern Russia, has free access to the Sea of Japan, Sea of Okhotsk, is relatively close to the intensively developing countries of the Pacific Rim. Abundant woodland, mountain, and water resources provide for diverse wildlife and rich vegetation.

Unfortunately, due to the act of man many species have become rare. The Red Book of Khabarovsk Kray includes 167 species of plants and mushrooms, 127 species of mammals, 5 species of amphibians and reptiles, 27 species of birds.

Population of the Kray makes 1,405,544 people with urban population accounting for 80% thereof. There are several cities in the territory of Khabarovsk Kray, major cities being Khabarovsk and Komsomolsk-on-Amur. The population of Khabarovsk makes 577,478 people, that of Komsomolsk-on-Amur - 271,377 people. In the recent years, negative dynamics in the number of population is observed, which is due to the

negative natality (mortality exceeds birth rate) and migration of people to more comfortable regions of the country. Life expectancy in Khabarovsk Kray makes 63.8 years, which is lower than Russia's average.

### **Harmful ecological factors**

The main ecological factors affecting people's health are air pollution and poor quality of drinking water, especially in large populated areas. Morbidity makes 137,193.4 cases per 100,000 people. Cardiovascular and respiratory diseases take the lead in the general morbidity structure.

The Kray's industrial output accounts for 1.5% of the all-Russian production index and it ranks first in the Russian Far East. Khabarovsk Kray is famous for mining, coal, metallurgy, oil-refining industries, logging and fishing. There are about 1,500 industrial enterprises of record, which are qualified as sources of pollutant emission to the atmosphere. These are power-industry and heat-generation enterprises, and housing and communal services.

Recently, ecology-dependent diseases-pneumonia, bronchial asthma (especially in children), neoplasms in all age groups - have been found to increase in rate.

It is **forest fires** that are responsible for the high level of air pollution in Khabarovsk Kray. Forest fire rate in the territory of the Kray is Russia's highest. The ratio of the total fire area to the total woodland area in Khabarovsk Kray makes 10%, whereas in the majority of territories of the country it varies within 1-2%. Since populated areas are in close vicinity to woodlands, forest fires often create a critical medico-ecological situation and pose a threat to the health of people residing in the areas of long-term smoky environment.

A powerful discharge of solid pollutants (carcinogens, soot, and dust) and volatile products of pyrolysis to atmosphere represents the main

danger. Carbon oxide, nitrogen dioxide, phenol, and formaldehyde levels in the period of heavy fires exceed maximum allowable concentrations several times as compared to no-fire seasons. Scientists of our university (V.A. Dobrykh et al., 2008) conducted a study and found out that bronchial asthma morbidity rate in children was increasing; complications of respiratory and ischemic heart diseases in adults were aggravating, bronchial spasmolytic sales at pharmacies were rising sharply during heavy-fire periods. Irina Shatalova and Elena Kudelko, our coworkers, observed and reported that pregnant women exposed to long-term smoke effect had more toxicoses and premature deliveries, demonstrated a growing tendency towards a shorter labor stage, labor complications. Moreover, signs of fetal hypoxia and fetoplacental insufficiency were registered. Higher risk of fetal asphyxia and subsequent development of newborn abnormalities were reported.

### **Ecological impact of the Amur River**

The Amur River is Khabarovsk Kray's treasure. There are 2,800 species of vascular plants, about 380 species of birds, 23 species of amphibians and reptiles, over 70 species of mammals inhabiting the Amur River and Amur River basin. The Amur River basin provides home for 95% of the Far Eastern storks, 65% of Japanese crane population and 50% of white-napped cranes. The Amur River is a habitat and spawning area for fresh-water fish, 7 species of Pacific planetous salmon, 2 species of sturgeons with the world's largest sturgeon-kaluga. Fresh water is the main resource of the Amur River, which carries 346 cubic kilometers of water to the Pacific Ocean annually. More frequently occurring contamination of drinking water increases the risk for people to catch hepatitis A, and many enteric infections, including bacillary dysentery. The infection incidence exceeds Russia's average.

Chemical pollution is one of the identified

perils for the Amur River; much of the pollution is attributed to the water flow from the Sungari River, the Amur's largest tributary running in the territory of China. Several accidents at Chinese industrial plants, particularly in the city of Jilin, brought about marked contamination of the Amur River with toxic substances, buildup of toxic bed silt in the lower reach. Eating fish and drinking ill-treated water from the Amur may cause damage to different systems of a human body. According to the biomonitoring findings, the Amur River aboriginals, whose staple foods are fish, suffer from liver damage, CNS disorders and diseases of hematopoietic system, which are of chemical origin.

### **Ecology improvement measures**

In Khabarovsk and Komsomolsk-on-Amur, where over 60% of the Kray's population reside, a regulation was adopted to prohibit the use of the Amur River for mass recreation. In accordance with the programs of the Russian Federation Ministry of Natural Resources and the Government of Khabarovsk Kray, the Institute of Water and Ecological Problems of the Far-Eastern Branch of the Russian Academy of Sciences carries out a scientific research into the quality of Amur River water. Russian-Chinese joint monitoring of the Sungari and Amur Rivers has been implemented, new additional filters have been installed at water intake facilities, and swimming has been prohibited. Development of Tunguska water deposit is under way. By 2010, water from the alternative Tunguska River source will be supplied to Khabarovsk residents.

Raising the level of ecological awareness and making the public to partake in solution of environmental problems are among the efforts to be made to improve the situation. And much has been already done-36 ecological biological youth associations function in Khabarovsk and Komsomolsk-on-Amur, school ranger organizations work to guard forests, and so on. In

2005, the Governor of Khabarovsk Kray announced days of protection from environmental danger (competitions, festivals, shows, tree planting, garbage removal, etc.)

In May 2007, the State Duma in Moscow held a parliamentary hearing on the Amur River problem. Draft federal law *On Amur River Basin Protection* has been developed. Khabarovsk Kray Association of Indigenous Small-Number Peoples plays a proactive role in solution of the Amur River problems. A Concept Program of Ecological Development of Khabarovsk Kray up to 2010 is being currently implemented. It is inclusive of special measures aimed at air protection, surface and underground water conservation, industrial waste handling control, and ecological monitoring.

In conformity with the current law on environmental protection, the people are entitled to the right to public ecological control. However, public involvement has not been very efficient yet. All citizens of the country should become concerned about ecological problems. The nursing community may play an important part in health education. In addition, medical nurses of Khabarovsk Kray have always been contributing to the improvement of the environment through careful disposal of medical wastes and education of people in healthy lifestyle and sound environment.

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